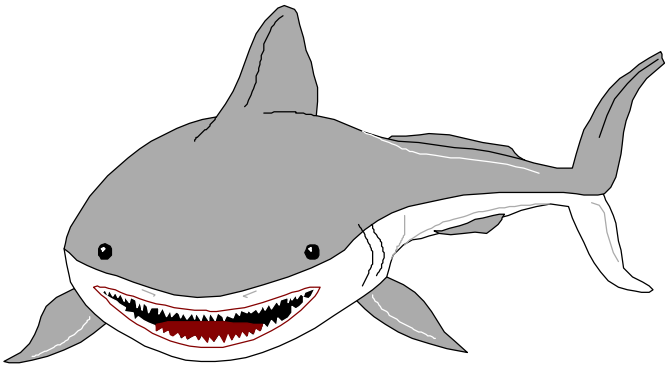
This skills unit contains:

- **whole numbers**
- **common fractions**
- **decimal fractions**
- **rounding numbers**

Whole numbers

STOP PRESS! IT'S IN THE NEWS!!



SHARKS DON'T STALK OUR BEACHES

Sydney, January 1997
From September to April, 500 metres offshore from popular beaches from Wollongong to Newcastle, 150 metre nets are being laid.
For 12 hours at a time 51 beaches will be netted 17 days a month for a cost of $380 000 a year.
And, the reason for this activity? To keep our beaches shark free. Between 150 and 200 sharks a year are caught in the nets. The catch in 1995-6 was 180, a third of which were assessed as man-eaters. But, it is the large numbers of dolphins, turtles and other marine life which are trapped and often killed that causes concern.
Since 1937 when netting began there has been only one shark attack in these waters. But many people are now questioning the cost to wildlife of this practice.

Each day you need to read numbers of all sizes.

If you want to get the most from the numbers you use, it's a good idea to understand our number system.

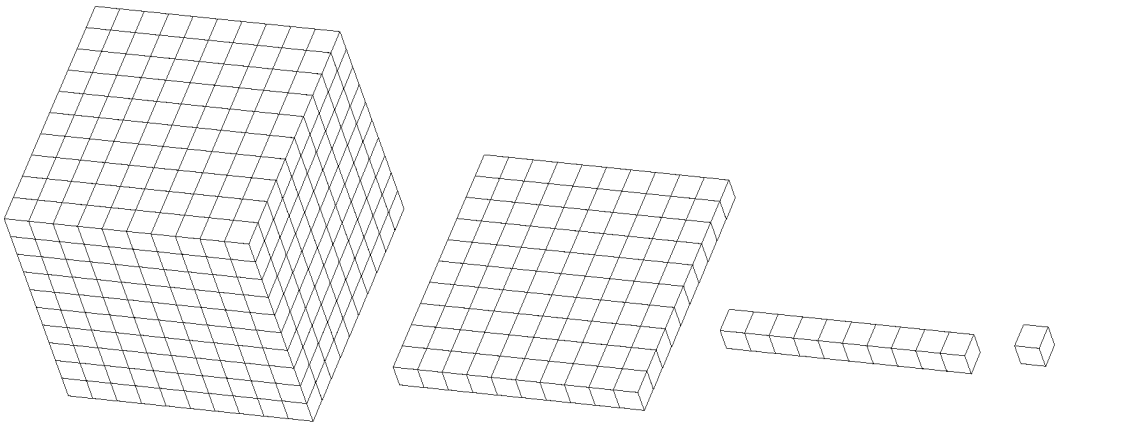
Our number system is based in tens. It is called a decimal system. It has been in use for about eight hundred years!
In a decimal system of numbers you use 9 digits - 1, 2, 3, 4, 5, 6, 7, 8, 9 - and 0 (zero) if you want to express nothing or if you want to make the other digits larger e.g. 80 is eighty because the 0 makes 8 ten times larger.

Each digit in a whole number is given meaning because of its place or position in the number.

The positions or place value of numbers:

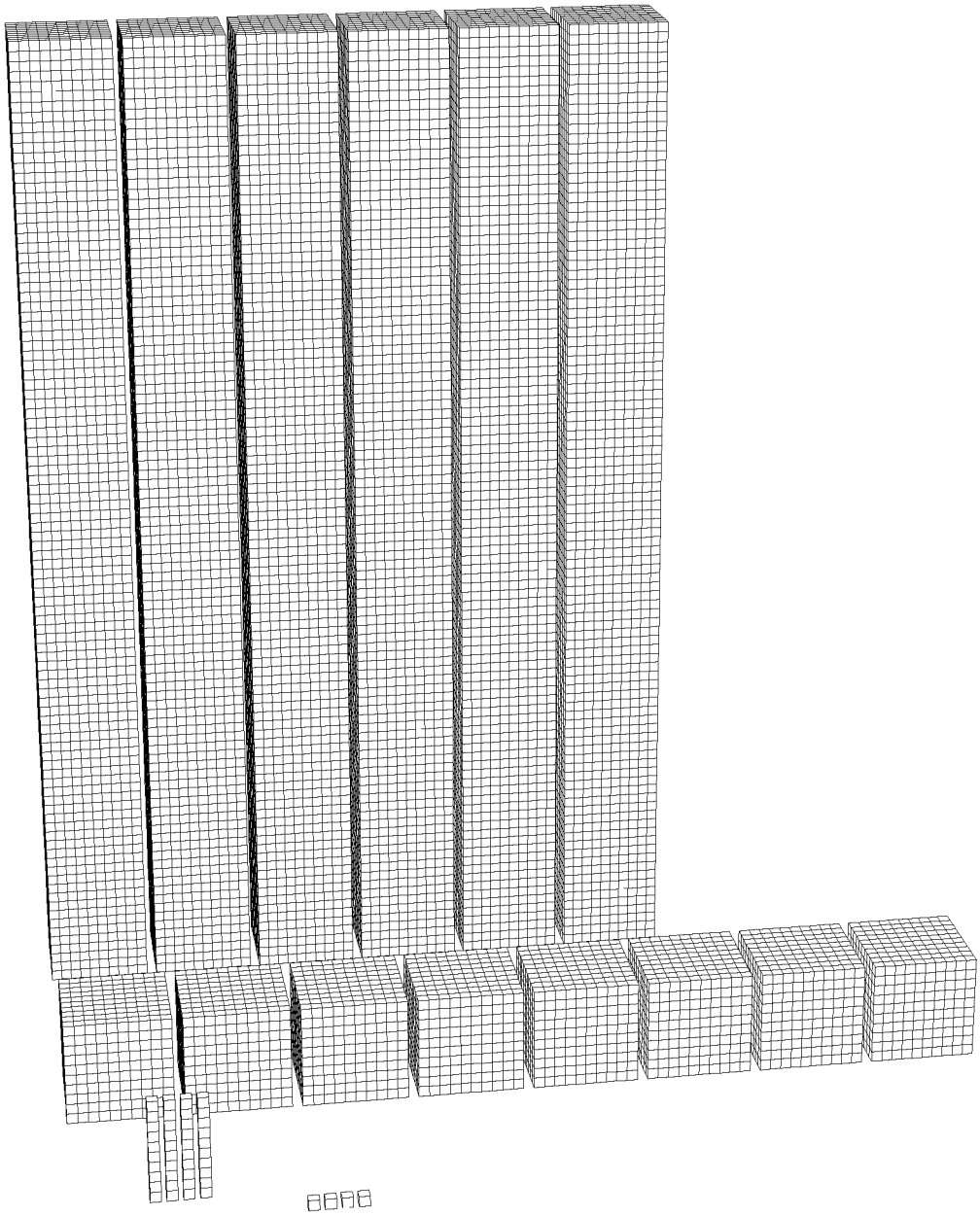
millions		**thousands**					
tens of millions	units of millions	hundreds of thousands	tens of thousands	units of thousands	hundreds	tens	units
	1	0	0	0	0	0	0
		(read as 1 million)					
		3	4	5	1	2	0
		(read as 345 thousand			1 hundred and 20)		
			6	8	0	4	4
		(read as 68 thousand			and 44)		
3	7	2	9	0	5	0	0
(read as		37 million 290 thousand			5 hundred)		

A mental picture of thousands, hundreds, tens and units might help!



Beyond these numbers it is hard to draw a meaningful representation.

68 044 could represented by –



Activity 1

1 Fill in the missing information:

	millions			thousands					
Number	tens of	units of	hundreds	tens of	units of	hundreds	tens	units	Name of Number
643 000			6	4	3	0	0	0	643 thousand
_____		5	2	5	0	6	0	0	_____
_____									8 thousand and 50
_____				9	3	1	1	0	_____
70 476									_____
_____									21 million 309 thousand
_____			7	5	0	0	5	0	_____

2 Use all the digits given to write the smallest and largest numbers possible and name the numbers:

e.g. 6 8 4 9 1

smallest no. 14 689 **name** 14 thousand 6 hundred and 89

largest no. 98 641 **name** 98 thousand 6 hundred and 41

a) 3 2 8 1 6 7

smallest no._____ **name**_____

largest no. _____ **name**_____

b) 5 1 9 2

smallest no. _____ **name** _____

largest no. _____ **name** _____

Activity 1 Answers

1

	millions	thousands						name of number
643 000			**6**	**4**	**3**	**0**	**0**	**0**	643 thousand
5 250 600		5	2	5	0	6	0	0	**5 million 250 thousand and 600**
8 050					**8**	**0**	**5**	**0**	8 thousand and 50
93 110				9	3	1	1	0	**93 thousand 110**
70 476				**7**	**0**	**4**	**7**	**6**	**70 thousand 476**
21 309 000	**2**	**1**	**3**	**0**	**9**	**0**	**0**	**0**	21 million 309 thousand
750 050			7	5	0	0	5	0	**750 thousand and 50**

2 a) smallest: **123 678**
name: **123 thousand, 6 hundred and 78**
largest: **876 321**
name: **876 thousand, 3 hundred and 21**

b) smallest: **1259**
name: **1 thousand, 2 hundred and 59**
largest: **9521**
name: **9 thousand, 5 hundred and 21**

Common fractions

These are all common fractions -

$\frac{1}{3}$ $\frac{1}{2}$ $\frac{4}{5}$ $\frac{1}{4}$ $\frac{1}{10}$

Fractions describe **part** of a whole.

We use common fractions to describe where part of a whole occurs eg. $\frac{1}{3}$ of a pizza left, about $\frac{1}{2}$ a carton of milk.

$\frac{1}{3}$ is read **'one third'**;
it means **one part out of the three equal parts that make up the whole.**

$\frac{3}{4}$ **(three-quarters or three fourths)** means **3 parts out of 4 equal parts.**

$\frac{3}{4}$ could be represented by 

You will see fractions given like:

$\frac{3}{4}$ **or** $\frac{3}{4}$

This module uses both so you get used to different formats.

Activity 2

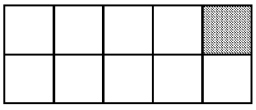
1 Complete the table:

Common fraction	Read as	Meaning
$^1/_2$	one half	one part out of 2 equal parts
$^4/_5$		
$^1/_4$		
$^1/_{10}$		
$^7/_8$		
$^2/_3$		

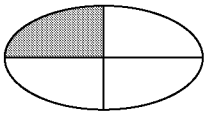
2 Match each of the fractions given to one of the pictures below:

$\frac{1}{3}$ $\frac{1}{2}$ $\frac{4}{5}$ $\frac{1}{4}$ $\frac{1}{10}$

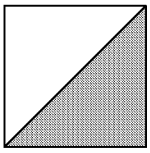
A



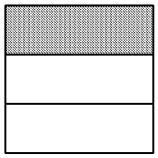
B



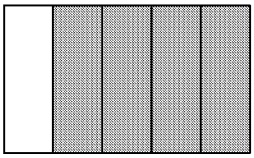
C



D



E

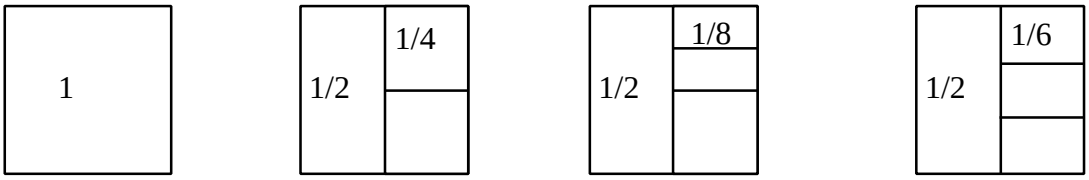


Activity 2 Answers

1	$\frac{1}{2}$	one half	one part out of 2 equal parts
	$\frac{4}{5}$	four fifths	four parts out of 5 equal parts
	$\frac{1}{4}$	one quarter (or one fourth)	one part out of 4 equal parts
	$\frac{1}{10}$	one tenth	one part out of 10 equal parts
	$\frac{7}{8}$	seven eighths	seven parts out of 8 equal parts
	$\frac{2}{3}$	two thirds	two parts out of 3 equal parts

2	$\frac{1}{3}$	D	$\frac{1}{4}$	B
	$\frac{1}{2}$	C	$\frac{1}{10}$	A
	$\frac{4}{5}$	E		

Look at these diagrams and try to make some connections in forming fractions of equal value:



1 whole $\frac{1}{2} = \frac{2}{4}$ $\frac{1}{2} = \frac{4}{8}$ $\frac{1}{2} = \frac{3}{6}$

From the diagrams:

1 whole $= \frac{\square}{2}$ or $\frac{\square}{4}$ or $\frac{\square}{8}$ or $\frac{6}{6}$

$\frac{1}{2} = \frac{\square}{4}$ or $\frac{\square}{8}$ or $\frac{\square}{6}$ or . . . . . .

Did you get these answers?

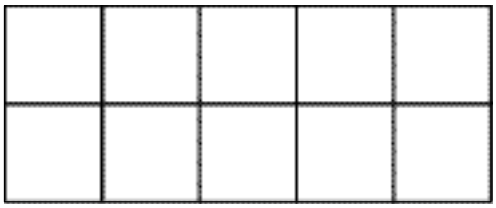
$\frac{1}{2}$ **=** $\frac{2}{4}$ **or** $\frac{4}{8}$ **or** $\frac{3}{6}$

These are examples of **equivalent fractions**.

You may use equivalent fractions to make fractions simpler or for calculating with fractions, see the **Calculation C** skills unit.

Now to form some equivalent fractions:

A chocolate bar:

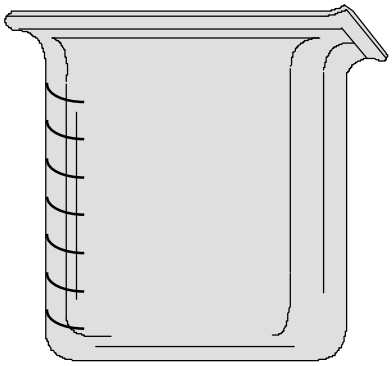


each part is $\frac{1}{10}$ of the bar

$\frac{1}{2}$ of the bar is the same as $\frac{5}{10}$

A tape measure: 5 mm = $\frac{5}{10}$ cm or $\frac{1}{2}$

A measuring beaker: 500 mL = $\frac{1}{2}$ L



or $\frac{500}{1000}$ L

or $\frac{50}{100}$ L

or $\frac{5}{10}$ L

What do you notice about $\frac{1}{2}$ and $\frac{5}{10}$?

$\frac{1}{2}$ and $\frac{5}{10}$ are the same amount

To get $\frac{5}{10}$ from $\frac{1}{2}$ without drawing pictures:

you need to multiply (x) both the 1 and 2 in $\frac{1}{2}$ by 5 to get $\frac{5}{10}$

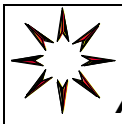
ie. $\frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$

In the same way,

$\frac{3}{4} = \frac{6}{8}$ $\left(\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}\right)$

$\frac{3}{4} = \frac{12}{16}$ $\left(\frac{3}{4} \times \frac{4}{4} = \frac{12}{16}\right)$

Equivalent fractions are formed be **multiplying** or **dividing** the numerator and denominator of a fraction by the same number.



Activity 3

1 Make some fractions which are equivalent to the fractions given:

eg. $^{2}/_{3}$ = $^{4}/_{6}$ or $^{10}/_{15}$ or $^{8}/_{12}$ or . . . . . .

a) $^{1}/_{4}$

b) $^{2}/_{5}$

c) $^{3}/_{10}$

2 Form equivalent fractions to help you decide whether to place < (less than), > (more than) or = (equal to) in the space between the fractions:

eg. $^{1}/_{4}$ $^{1}/_{3}$

form equivalent fractions of the same type (twelfths)

$^{3}/_{12}$ $^{4}/_{12}$

$^{3}/_{12}$ < $^{4}/_{12}$ so $^{1}/_{4}$ < $^{1}/_{3}$

a) $^{3}/_{4}$ $^{1}/_{2}$

b) $^{5}/_{8}$ $^{3}/_{4}$

c) $^{3}/_{5}$ $^{9}/_{10}$

d) $^{1}/_{2}$ $^{2}/_{5}$

e) $^{4}/_{10}$ $^{2}/_{5}$

Activity 3 Answers

1 a) $\frac{1}{4} = \frac{2}{8}$ or $\frac{3}{12}$ or $\frac{4}{16}$ or $\frac{5}{20}$

b) $\frac{2}{5} = \frac{4}{10}$ or $\frac{6}{15}$ or $\frac{8}{20}$ or $\frac{10}{25}$

c) $\frac{3}{10} = \frac{6}{20}$ or $\frac{9}{30}$ or $\frac{12}{40}$ or $\frac{15}{50}$

2 a) $\frac{3}{4} > \frac{1}{2}$ $(\frac{3}{4} > \frac{2}{4})$

b) $\frac{5}{8} < \frac{3}{4}$ $(\frac{5}{8} < \frac{6}{8})$

c) $\frac{3}{5} < \frac{9}{10}$ $(\frac{6}{10} < \frac{9}{10})$

d) $\frac{1}{2} > \frac{2}{5}$ $(\frac{5}{10} > \frac{4}{10})$

e) $\frac{4}{10} = \frac{2}{5}$ $(\frac{4}{10} = \frac{4}{10})$

Decimal fractions

Decimals (short for **decimal fractions**) are the groups of **common fractions that are tenths, hundredths, thousandths, etc.**

Decimals are formed by extending place value of whole numbers to fractions or parts of whole numbers.

Decimal number	hundreds 100s	tens 10s	units 1s	dec. point	tenths 1/10ths	hundredths 1/100ths	thousandths 1/1000ths
e.g. 3.69 (3 and 69 hundredths)			3	.	6	9	
541.8 (5 hundred and 41 and 8 tenths)	5	4	1	.	8		
92.166 (92 and 166 thousandths)		9	2	.	1	6	6

Note: 0.7 is equivalent to $\frac{7}{10}$ and $\frac{70}{100}$.

0.75 is equivalent to $\frac{75}{100}$

Activity 4

1 Give equivalent fractions with denominators of 10 and 100 for the following:

eg. 0.5 = $\frac{5}{10}$ or $\frac{50}{100}$

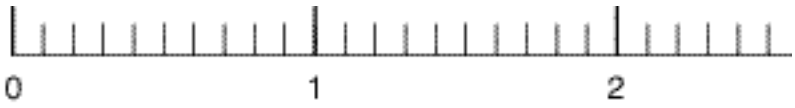
a) 0.2 = _____ or _____

b) 0.9 = _____ or _____

c) 0.75 = _____

d) 0.43 = _____

2 Use the following number line to position the decimal numbers:



a) 0.6 d) 1.2 g) $^{4}/_{10}$

b) 0.35 e) 1.55 h) $1^{7}/_{10}$

c) 0.15 f) 1.9 i) $1^{85}/_{100}$

Activity 4 Answers

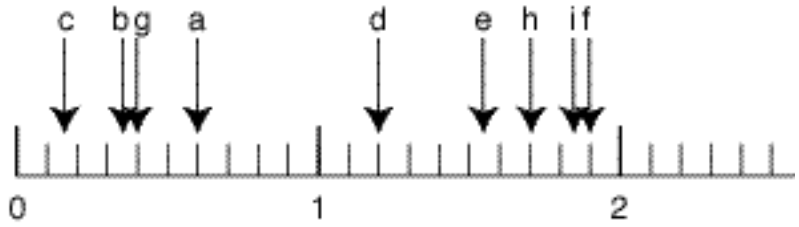
1 a) $\frac{2}{10}$ or $\frac{20}{100}$

b) $\frac{9}{10}$ or $\frac{90}{100}$

c) $\frac{75}{100}$

d) $\frac{43}{100}$

2

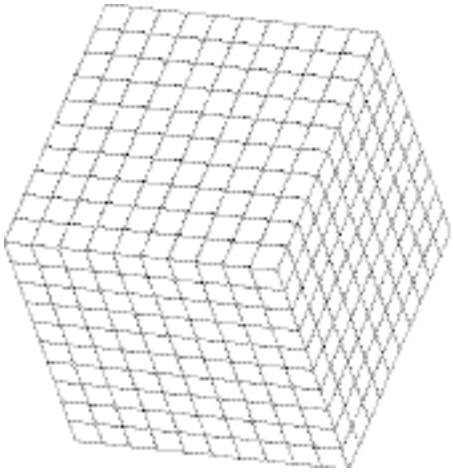


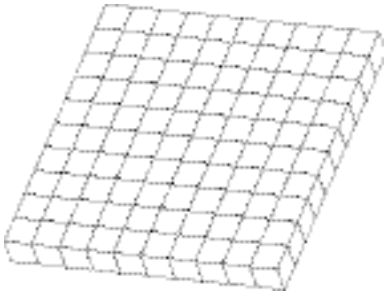
Decimals in hundredths can also be written as percentages:

15% OFF
ALL TOYS

15% is $\frac{15}{100}$ or 0.15
and for every $100 you spend you get $15 off the price.

Another explanation which may help with decimal place value:

if  is 1 whole

then  is $\frac{1}{10}$

(10 x $\frac{1}{10}$ = 1 whole)

and  is $\frac{1}{100}$

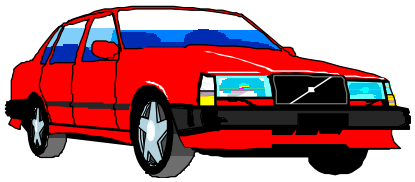
(100 x $\frac{1}{100}$ = 1 whole)

and  is $\frac{1}{1000}$

(1000 x $\frac{1}{1000}$ = 1 whole)

0.5 is the same as .5
0.5 is the same as 0.50 or 0.500 . . . . .
0.85 means $\frac{8}{10} + \frac{5}{100}$ or $\frac{85}{100}$

Rounding numbers



The distance to Wangat is 178 km.

In estimating fuel, do you use 170 km or 180 km?

Sometimes you need to 'round' numbers so that you can quickly estimate values or quantities.

How do you round?

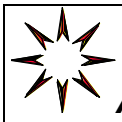
If number is in tens (ie. between 1 and 100) - round to the **nearest ten.**

eg. 82 is nearer to <u>80</u> than to 90

If number is in hundreds (ie. between 100 and 1000) - round to the **nearest hundred..**

eg. 374 is nearer to <u>400</u> than to 300

Note: 350 is exactly half way between 300 and 400, but is generally rounded to 400.
In the same way, 85 would be rounded to 90.



Activity 5

1 Circle the number you would **round** to:

27 is nearer to	20	30
270 is nearer to	200	300
13 is nearer to	10	20
525 is nearer to	500	600

2 The height of Mt Everest is 8847m. Give this height to:

a) the nearest hundred metres

b) the nearest thousand metres

3 The population of a town is 26 719 people.
Give this population to:

a) the nearest hundred

b) the nearest thousand

c) the nearest ten thousand

4 The sales of a book store are $849 239 for 1997.
Find the sales to:

a) the nearest thousand $

b) the nearest hundred thousand $

Activity 5 Answers

1	27	is nearer to	20	30
	270	is nearer to	200	300
	13	is nearer to	10	201
	525	is nearer to	500	600

2 a) 8800m
c) 9000m

3 a) 26 700
b) 27 000
c) 30 000

4 a) $849 000
b) $800 000

You round decimals for estimating or to make sense of a calculator answer.

eg. The cost of 2.8 m of fabric @ $10.89 metre comes to $30.492 on your calculator. This doesn't seem to make sense.

To make sense of $30.492 you need to understand that the calculator doesn't know you are calculating an answer in $.

How could it, it just deals with figures.

$30.492 can be rounded to $30.49 (to the nearest cent) or to $30.50 (to the nearest 5 cents)

For money, you will want only 2 decimal places (hundredths).

For other metric quantities eg. kg or km, you may need to round to 3 decimal places (thousandths) to give g or m.

Activity 6

1 Round to hundredths (2 decimal places):

a) $5.668 b) $0.483

c) $42.795 d) $128.082

2 Round to thousandths (3 decimal places):

a) 1.2249 kg b) 10.5032 t

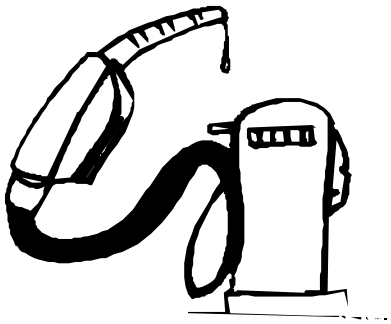
c) 0.1188 km d) 25.4504 L

3 In filling out her tax form Tess needed to round her tax ($5 814.84) paid for the year to the nearest dollar. What is this amount?

4 Juan fills his car with 39.4 litres of petrol priced at 74.9 cents per litre. The cost calculates as $29.5106.
What is this amount rounded to

a) the nearest cent?

b) the nearest 5 cents?



Activity 6 Answers

1 a) $5.67
b) $0.48
c) $42.80 (for $42.795 round up 5 to 10, to make 79 become 80)
d) $128.08

2 a) 1.225 kg
b) 10.503 t
c) 0.119 km
d) 25.450 L

3 $5815.00

4 a) $29.51
b) $29.50

Test yourself on this skills unit

Make sense of this story by adjusting the size of the numbers - remove zeros, or put in a decimal point, or move the decimal point.

Would you believe it?

*Effies who was **172 metres** tall rushed to the hospital to visit her sister.*

*It was a cold day with the temperature at about **80°C** and strong winds of **7500km/hour** blowing. Already that morning **1100mm** of rain had fallen.*

*She drove for **12 mins** to reach the hospital, **85km** away. She arrived just in time to see her new nephew. He weighed **3840kg** at birth and in the few days since had put on another **2050gm**.*

*On her way home Effie spent **$2350** on meat and groceries for dinner. A stop for petrol cost her **$2948** for **4100** litres at **719** cents per litre.*

*When she arrived home she had just over **$4700** left from the **$10 000** she left home with that morning.*

Now you've made some changes is the story more believable?

Test yourself on this skills unit Answers

Answers in the order they appear in the story:
1.72 metres
8.0°C, 75.00 km/hr, 11.00 mm
12 mins, 8.5 km, 3.840 kg, 205.0 g
$23.50, $29.48, 41.00 litres, 71.9 cents per litre
$47.00, $100.00

